

Traffic conditions on most roadway facilities are analyzed using the principles or the specific analysis methods contained in the *Highway Capacity Manual, 2000 Edition (HCM)*, a publication of the Transportation Research Board, a research agency affiliated with the Federal Government. Chapter 9 of the *HCM* is devoted to analysis of signalized intersections and Chapter 10 is devoted to the analysis of unsignalized intersections. The methodology in the *HCM* for signalized intersections is based upon measurements or forecasts of control delay for traffic utilizing all approaches to the intersection. Intersection average delay and poorest movement delay are reported for all unsignalized intersections.

Traffic conditions in Southern California are also often evaluated at signalized intersections using a methodology known as the Intersection Capacity Utilization (ICU) technique. This methodology is widely accepted and essentially measures the amount of traffic signal "green" time required for the intersection. It is a significant variation from the *HCM* method; however, it produces results that are generally similar. The City of Costa Mesa indicates that studies analyze all signalized intersections by the ICU method. It requires all unsignalized intersections to be analyzed by the *HCM* method. The City of Costa Mesa defines LOS D as an acceptable traffic operation level for all intersections. Appendix A lists the ICU level of service criteria for signalized intersections and the *HCM* criteria for unsignalized intersections. It also defines the level of service and ICU ranges as applied to signalized intersections.

The specific assumptions for the ICU analysis include the use of a saturation flow value of 1,600 vehicles per lane per hour (VPLPH) and no loss time is applied to the ICU calculations to be consistent with the City of Costa Mesa procedures.

The analysis of peak hour intersection conditions was conducted using the TRAFFIX software program developed by Dowling Associates.

Traffic Count Data

AM and PM peak period turning movement traffic counts for the four intersections were conducted in October, 2011. All traffic count data used in this study is compiled in Appendix B.

Near Term Traffic Volumes

Per City direction, Near Term traffic volumes were derived by applying an appropriate ambient traffic growth factor to existing traffic volumes. An ambient growth factor of 2% is appropriate for the study area, where it is substantially developed with normal urban traffic volumes. The project is planned for completion in approximately one year. Therefore, 2012 is the appropriate year of near term analysis.

Significant Impact Criteria

The City of Costa Mesa's significant impact criteria is used to identify intersections that can be categorized as either satisfactory or deficient, so that appropriate mitigation measures can be made for non-satisfactory intersections to bring them to satisfactory operating conditions. The City's project impact analysis criterion indicates:

- A significant project impact occurs when the ICU value increases by greater than 0.01 and achieves unacceptable level of service (“E” or “F”).

The significant impact criteria for signalized intersections provided above are based on the City’s General Plan. The City does not have significant impact criteria for unsignalized intersections. This study uses the following criteria:

- Unsignalized intersection level of service is based upon the control delay, assessed only for those traffic movements that are stopped or must yield to through traffic. When delay for these movements is severe (Level of Service F), the intersection should be evaluated further for possible improvement with traffic signals. In some cases, this analysis determines that the delay is being experienced by a very low number of vehicles and traffic signals are not warranted. In other cases, the number of stopped vehicles is substantial and traffic signals may be justified as a mitigation measure.

An unsignalized intersection impact is therefore considered to be significant if the intersection is at LOS E or F, a traffic signal is warranted, and the project contributes added trips at that location. Future added traffic is defined as the increment of traffic added by the project plus other cumulative projects identified in and around the City plus ambient traffic increment of growth that is anticipated to occur by Year 2012.

In addition to the significant impact criteria provided above, projects must also comply with the Orange County Congestion Management Plan (CMP) criteria. The CMP specifies that a project cannot be allowed to reduce level of service or increase flow by more than 3% at a location that is forecast to experience Level of Service E or F, generally. This criterion is generally less stringent, so any project that meets the City General Plan criteria will also normally meet the County CMP criteria.

3. Existing Traffic Conditions

This section documents the existing conditions in the study area. The discussion presented here is limited to specific roadways in the project's vicinity.

Streets in the site vicinity include Superior Avenue, Anaheim Avenue, 18th Street, 17th Street and Newport Boulevard. Figure 3 shows the existing roadway network and the study intersection configurations/controls.

Circulation Network

Superior Avenue

Superior Avenue is a north/south 2-lane roadway north of 17th Street adjacent to the project site, and a 4-lane roadway south of 17th Street. Superior Avenue is designated as a Primary Arterial roadway south of 17th Street on the Master Plan of Arterial Highways (MPAH). The posted speed limit along Superior Avenue is 40 mph south of 16th Street/Industrial Way and 35 mph north of 16th Street/Industrial Way. The average daily traffic along Superior Avenue south of 17th Street is approximately 20,000 vehicles per day. The average daily traffic north of 17th Street is approximately 12,000 vehicles per day. There are no bike lanes along Superior Avenue in the project vicinity. Land use along Superior Avenue in the project vicinity is commercial and light industrial.

Anaheim Avenue

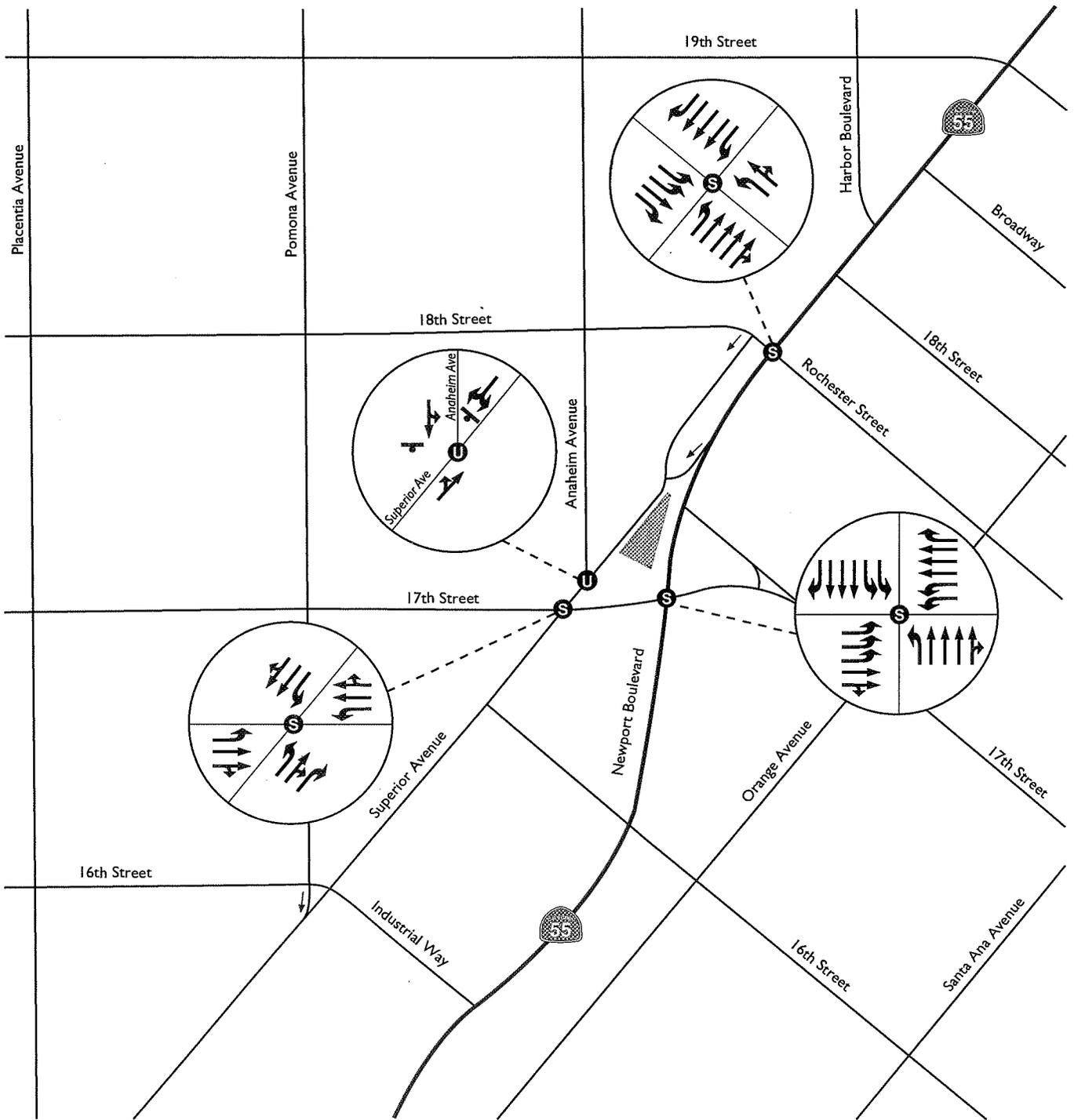
Anaheim Avenue is a north/south 2-lane roadway. The posted speed limit along Anaheim Avenue is 35 mph. On-street parking is allowed along both sides of the street. There are no bike lanes along Anaheim Avenue within the project vicinity. Land use along Anaheim Avenue is primarily residential with some commercial at 19th Street, 18th Street, and Superior Avenue.

18th /Rochester Street

18th Street (west of Newport Boulevard) and Rochester Street (east of Newport Boulevard) are east/west 2-lane roadways north of the project site. The posted speed limit is 30 mph along 18th Street and 25 mph along Rochester Street. On-street parking is allowed along both sides of the street. There are no bike lanes along 18th /Rochester Street within the project vicinity. Land use along 18th /Rochester Street is primarily residential with some commercial near Newport Boulevard.

17th Street

17th Street is an east/west 4-lane roadway east of Pomona Avenue and a 2-lane roadway west of Pomona Avenue. 17th Street is designated as a Secondary Arterial roadway west of Placentia Avenue, a Primary Arterial between Placentia Avenue and Newport Boulevard, and a Major Arterial east of Newport Boulevard on the MPAH. The posted speed limit along 17th Street is 35 mph. In the project



LEGEND

- Project Site
- One-Way Street
- Signalized Intersection
- Un-Signalized Intersection
- Stop Sign
- Lane Geometry



Not to Scale

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Figure 3
 Existing Intersection Geometry

vicinity, the average daily traffic along 17th Street is approximately 9,000 vehicles per day west of Newport Boulevard, and approximately 32,000 vehicles per day east of Newport Boulevard.

There are no bike lanes along 17th Street within the project vicinity. There are triple eastbound left turn lanes at 17th Street and Newport Boulevard. Traffic signal phasing at 17th Street and Newport Boulevard is protected. Traffic signal phasing at 17th Street and Superior Avenue is protected/permittted. Land use along 17th Street is primarily commercial with some office.

Newport Boulevard

Newport Boulevard is a north/south 6-lane roadway adjacent to the project site. Newport Boulevard is designated as a Major Arterial roadway south of 19th Street and a Primary Arterial north of 19th Street on the MPAH. The posted speed limit along Newport Boulevard is 40 mph. In the project vicinity, the average daily traffic along Newport Boulevard is approximately 85,000 vehicles per day north of 17th Street and approximately 53,000 vehicles per day south of 17th Street. There are no bike lanes along Newport Boulevard within the project vicinity. Land use along Newport Boulevard is primarily commercial with some office.

Peak Hour Intersection Level of Service

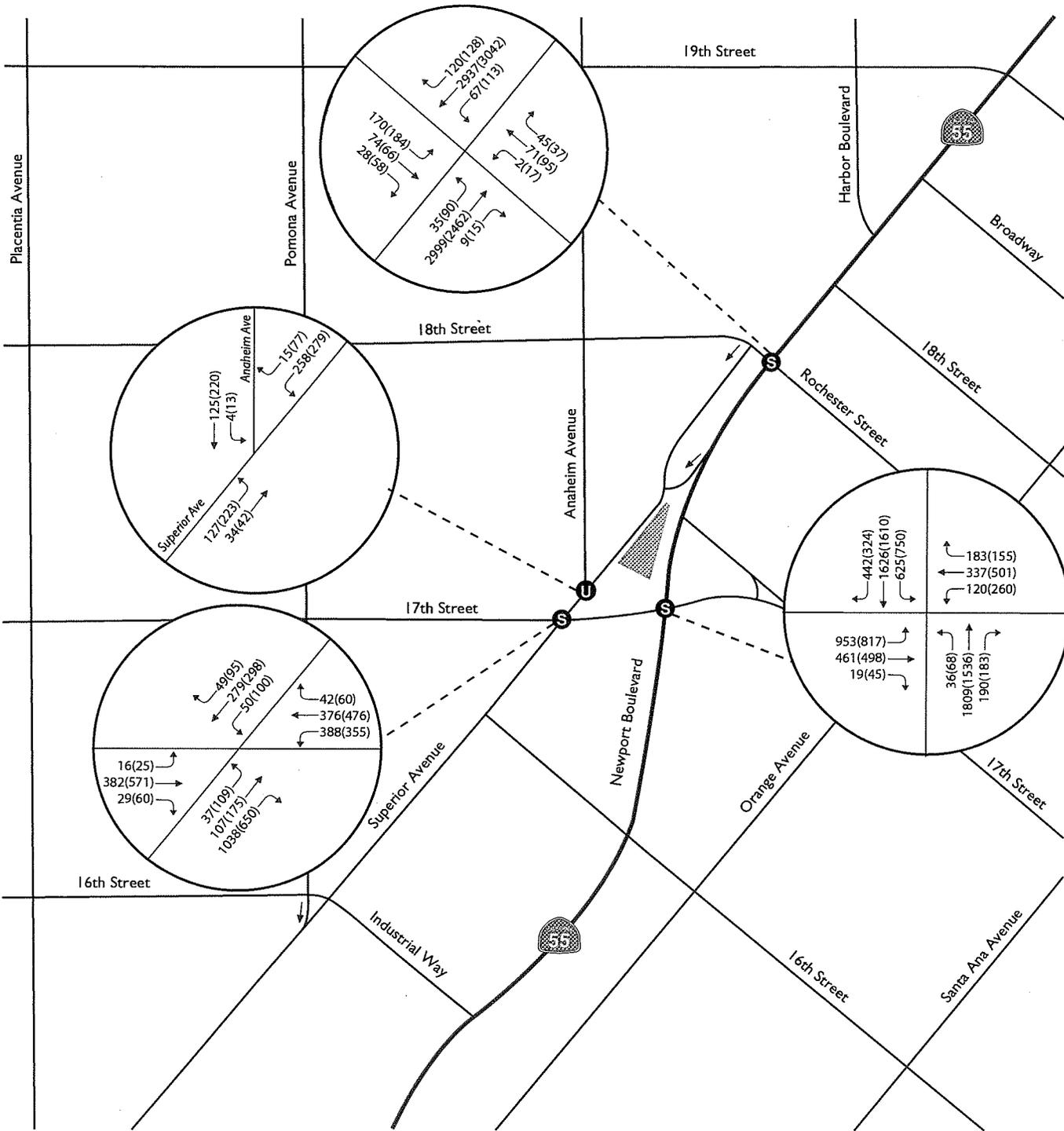
Table 1 summarizes the results of the existing level of service analysis for the study intersections. Figure 4 illustrates the existing AM/PM peak hour traffic volumes.

Table 1 – Existing Peak Hour Intersection Conditions

Signalized Intersections (ICU)	AM Peak Hour	PM Peak Hour
	ICU/LOS	ICU/LOS
Superior Avenue at 17 th Street	0.760 / C	0.739 / C
Newport Boulevard at 18 th Street	0.759 / C	0.830 / D
Newport Boulevard at 17 th Street	0.821 / D	0.778 / C
Unsignalized Intersection (HCM)	AM Peak Hour	PM Peak Hour
	Delay / LOS	Delay / LOS
Superior Avenue at Anaheim Avenue	12.7 / B	19.6 / C

Note: ICU = Intersection Capacity Utilization; LOS = Level of Service; Worst Case Delay is in seconds per vehicle

As shown in Table 1, all study intersections operate at acceptable levels of service during the AM and PM peak hours under Existing conditions. Appendix C contains the analysis worksheets for existing conditions.



LEGEND

- Project Site
- One-Way Street
- Signalized Intersection
- Un-Signalized Intersection
- XX(XX) AM(PM) Peak Hour Traffic Volume



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Figure 4
Existing AM/PM Peak Hour Traffic Volumes

4. Near Term Traffic Conditions Without Proposed Project

The project is anticipated to be completed and occupied by 2012. Near Term traffic increases are forecast by applying growth factors to existing year traffic volumes based upon normal ambient growth plus cumulative projects within the project study area.

Per City direction, to determine traffic volumes in 2012 without the proposed project, a growth factor of 2% is applied to the existing volumes. There are no cumulative projects in the project area.

Peak Hour Intersection Level of Service

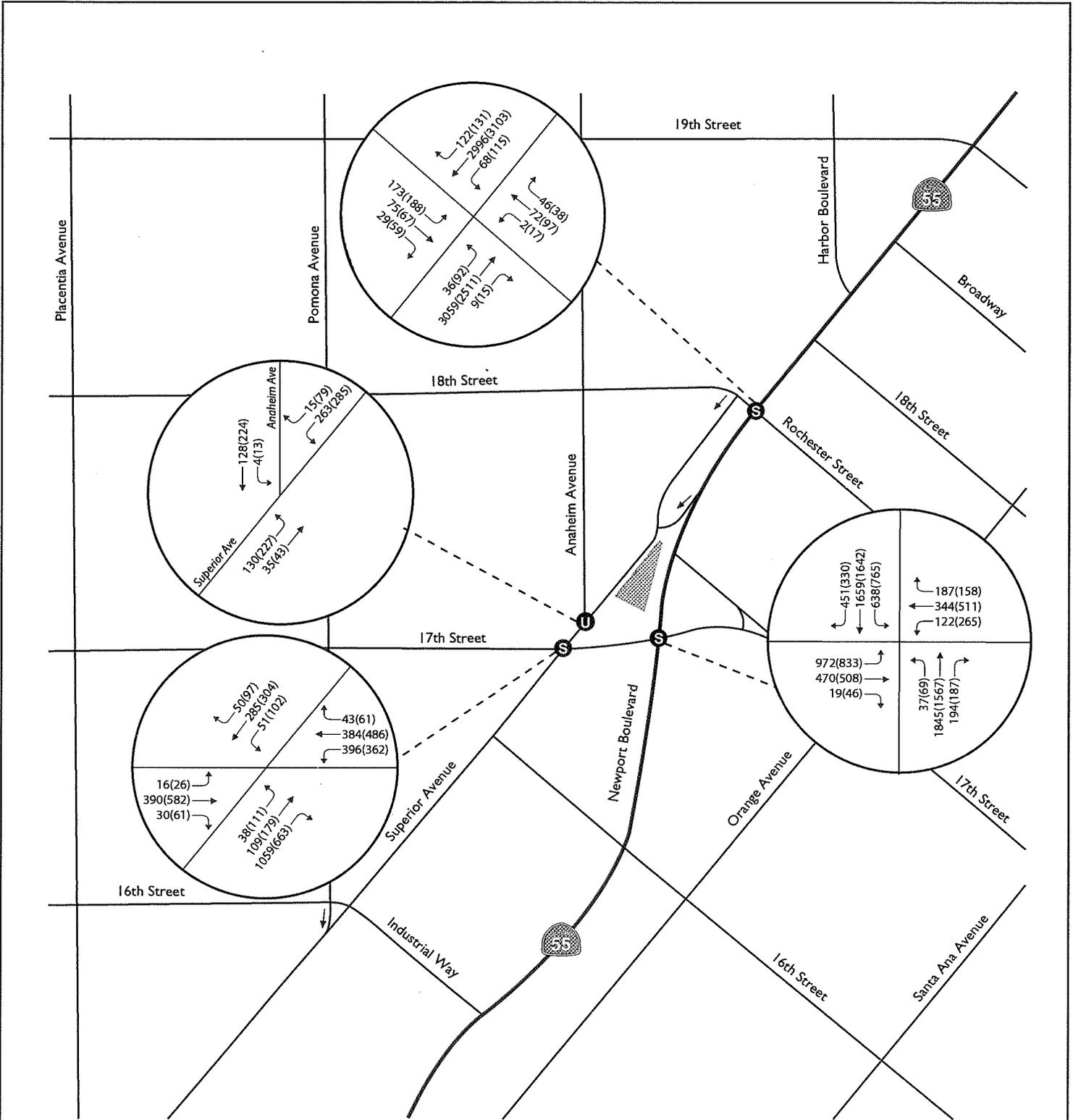
Figure 5 shows forecast traffic volumes for Near Term Without the Proposed Project in the AM and PM peak hours. Table 2 summarizes the results of the level of service analysis for the Near Term without the Proposed Project.

Table 2 – Near Term Without Project Peak Hour Intersection Conditions

Signalized Intersections (ICU)	AM Peak Hour	PM Peak Hour
	ICU/LOS	ICU/LOS
Superior Avenue at 17 th Street	0.775 / C	0.754 / C
Newport Boulevard at 18 th Street	0.775 / C	0.847 / D
Newport Boulevard at 17 th Street	0.837 / D	0.793 / C
Unsignalized Intersections(HCM)	AM Peak Hour	PM Peak Hour
	Delay / LOS	Delay / LOS
Superior Avenue at Anaheim Avenue	12.9 / B	20.5 / C

Note: ICU = Intersection Capacity Utilization; LOS = Level of Service; Worst Case Delay is in seconds per vehicle

In the Near Term Without Proposed Project scenario, all intersections are forecast to operate at acceptable levels of service in both the AM and PM peak hours. The level of service worksheets for Near Term Without Proposed Project conditions are provided in Appendix D.



LEGEND

- Project Site
- One-Way Street
- Signalized Intersection
- Un-Signalized Intersection
- XX(YY) AM(PM) Peak Hour Traffic Volume



Not to Scale

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5. Project Related Traffic

Trip generation is a measure or forecast of the number of trips that begin or end at the project site. These trips will result in traffic increases on the streets where they occur. The traffic generated is a function of the extent and type of development proposed for the site. Figure 2 (presented previously) illustrates the latest site plan provided by the applicant. As illustrated, the project consists of constructing a new Walgreens Store with a total 14,310 square-foot building area, including a 9,990-square-foot retail area on the first floor and a 4,320-square-foot basement.

Project Trip Generation

The project trip generation has been calculated in accordance with the Institute of Transportation Engineers (ITE) publication *Trip Generation (8th Edition, 2008)*. Table 3 presents the trip generation rates used to generate weekday peak hour and weekday daily project traffic volumes. Daily and peak hour trip generation for weekdays for the proposed project is shown in Table 4. As indicated on Table 4, the project generates 1,160 daily trips with 41 AM peak hour trips and 108 PM peak hour trips on weekdays.

Table 3 – Trip Generation Rates

Land Use	Unit	Daily	AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out
Pharmacy/Drugstore Without Drive-Thru ITE Code 880	TSF	90.06	3.20	1.89	1.31	8.42	4.21	4.21

Source: ITE Trip Generation, 8th Edition, 2008

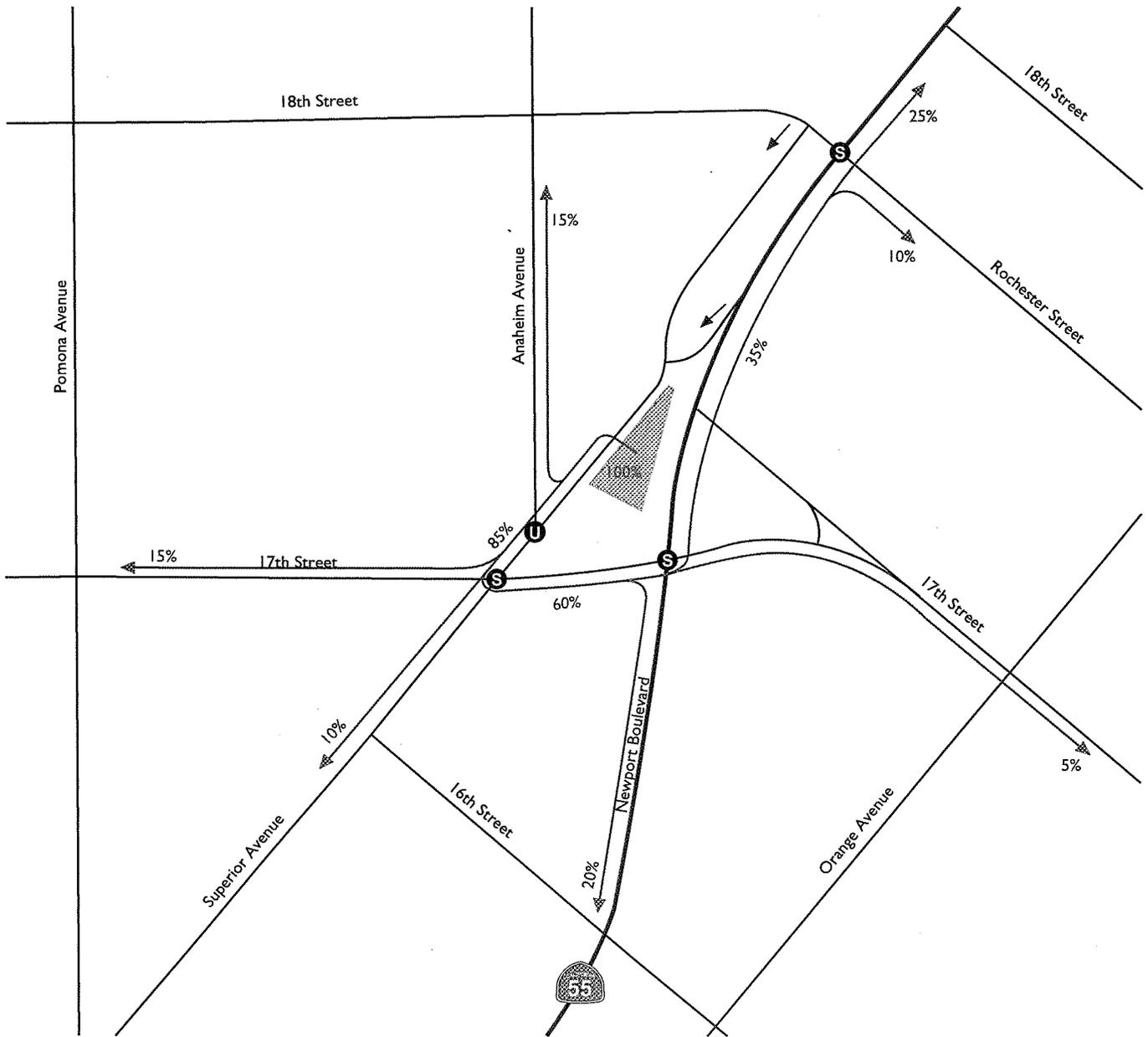
Table 4 – Trips Generated by Proposed Project

Land Use	Size	Daily	AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out
Pharmacy/Drugstore Without Drive-Thru ITE Code 880	14,310 sf	1,289	46	27	19	120	60	60
Pass-by Trip Reduction	10%	-129	-5	-3	-2	-12	-6	-6
Total Project Trips		1,160	41	24	17	108	54	54

Note: Totals may not add up 100% due to rounding in calculations; TSF = Thousand Square Feet

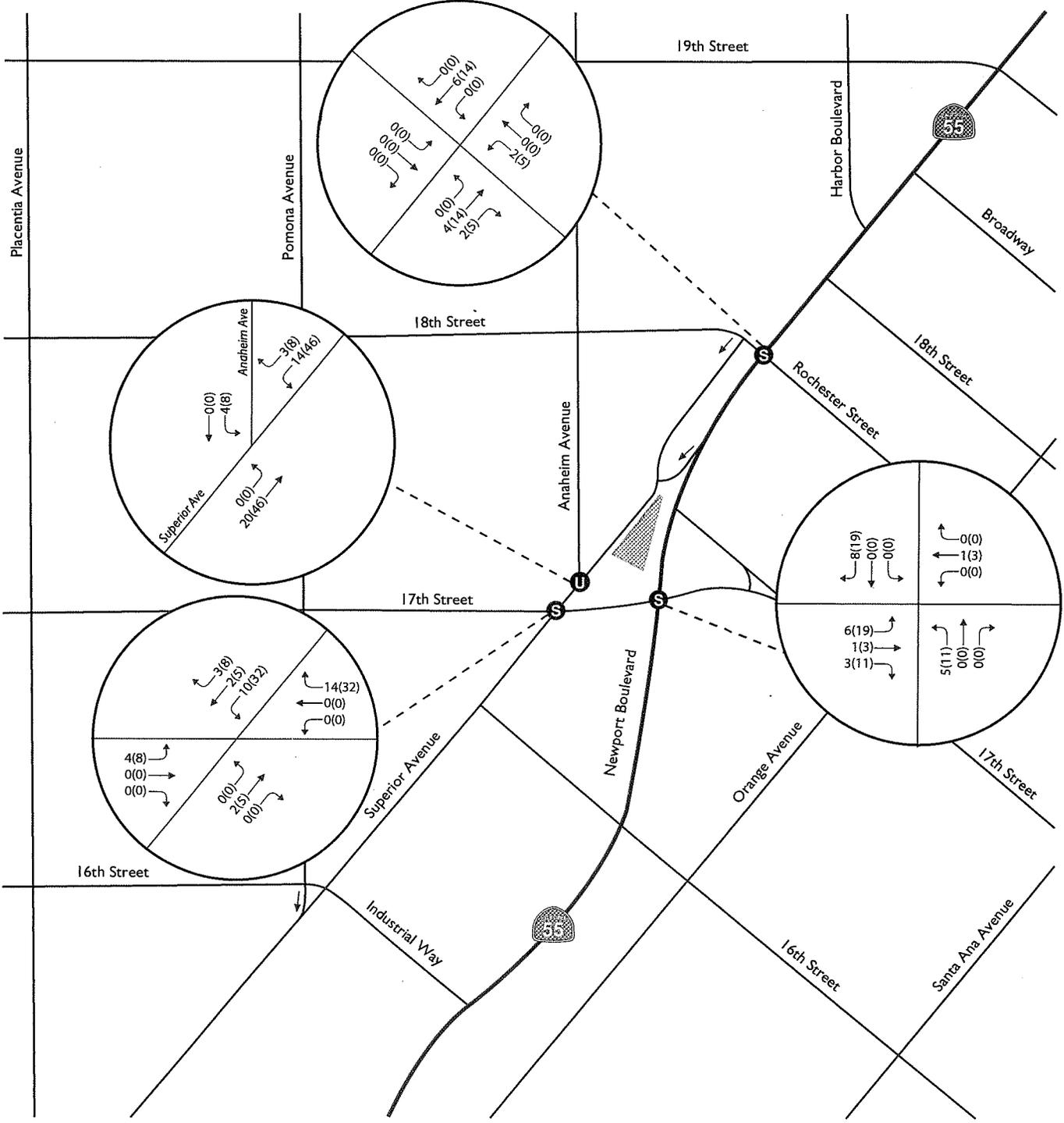
Project Trip Distribution

Figure 6 illustrates the anticipated Walgreens trip distribution pattern. The trip distribution pattern for project-generated traffic was developed based on existing traffic patterns, the geographical location of the site, the location of surrounding uses, and the proximity to the regional arterial and freeway system. The distribution pattern has been reviewed and approved by the City staff. Figure 7 shows project related AM and PM peak hour volumes calculated based on the trip generation and trip distribution.



LEGEND	
	Project Site
	One-Way Street
	Signalized Intersection
	Un-Signalized Intersection
	Trip Distribution Percentage

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LEGEND

- Project Site
- One-Way Street
- Signalized Intersection
- Un-Signalized Intersection
- XX(XX) AM(PM) Peak Hour Traffic Volume



Note: Totals may not add to 100% due to rounding

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Figure 7
Project-Related AM/PM Peak Hour Traffic Volumes

6. Existing Traffic Conditions With Proposed Project

This section documents the existing traffic conditions with the addition of project-related traffic to the surrounding street system. Existing "With Project" traffic volumes were derived by adding the project trips to the existing traffic volumes.

Peak Hour Intersection Level of Service

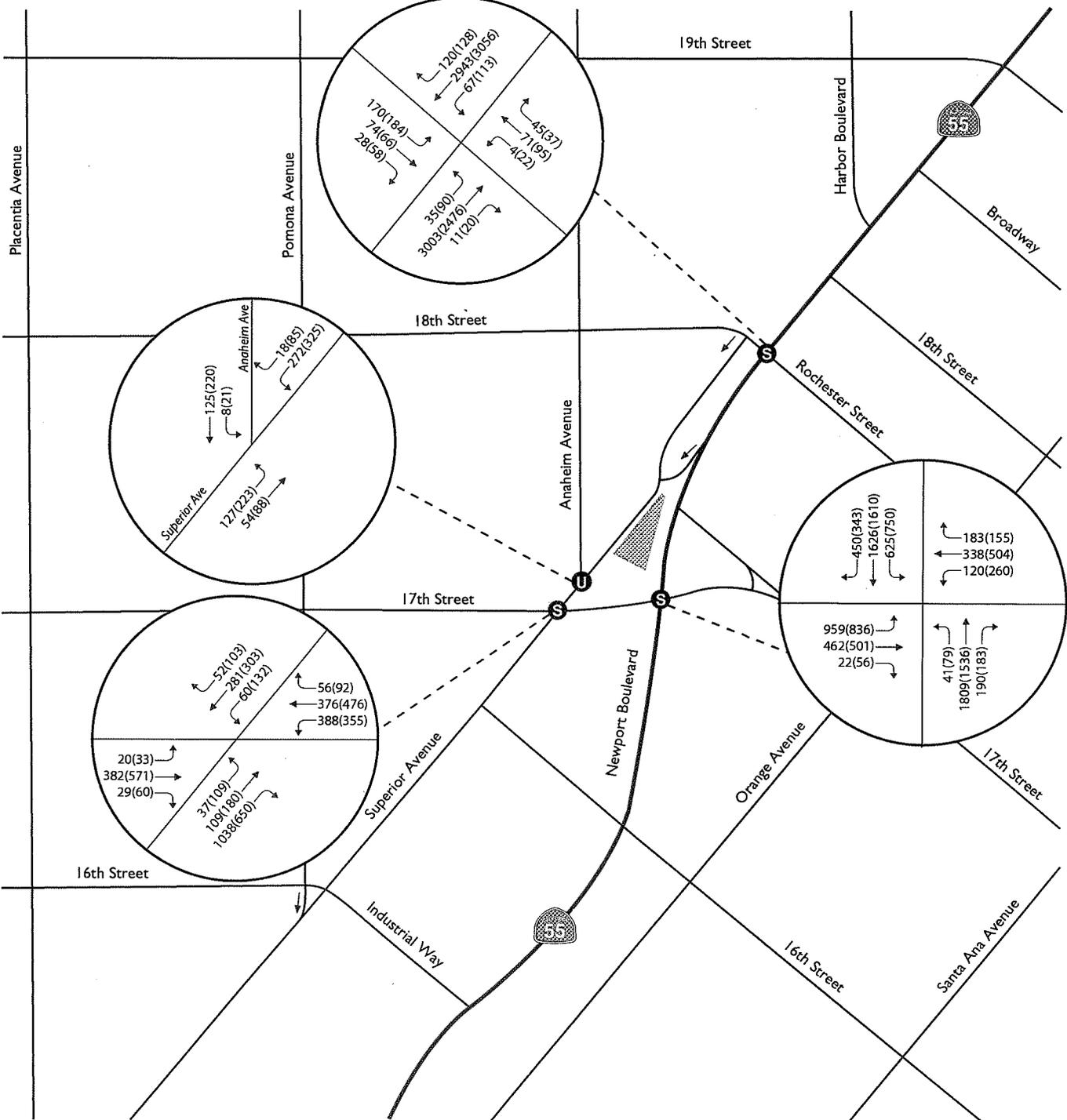
AM and PM peak hour traffic volumes used for this analysis are shown in Figure 8. Table 5 shows the results of the Existing "With Project" traffic analysis. In the Existing With Project scenario, all intersections in the AM and PM peak hours are forecast to operate at acceptable levels of service.

Table 5 – Existing With Project Peak Hour Intersection Conditions

Signalized Intersections (ICU)	AM Peak Hour	PM Peak Hour
	ICU/LOS	ICU/LOS
Superior Avenue at 17 th Street	0.767 / C	0.761 / C
Newport Boulevard at 18 th Street	0.761 / C	0.833 / D
Newport Boulevard at 17 th Street	0.822 / D	0.782 / C
Signalized Intersections (HCM)	AM Peak Hour	PM Peak Hour
	Delay / LOS	Delay / LOS
Superior Avenue at Anaheim Avenue	13.3 / B	26.4 / D

Note: ICU = Intersection Capacity Utilization; LOS = Level of Service; Worst Case Delay is in seconds per vehicle

The level of service worksheets for Existing With Project scenarios are provided in Appendix E.



LEGEND

- Project Site
- One-Way Street
- Signalized Intersection
- Un-Signalized Intersection
- XX(XX) AM(PM) Peak Hour Traffic Volume



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7. Near Term Traffic Conditions With Proposed Project

This section documents the Near Term traffic conditions with the addition of project-related traffic to the surrounding street system. Near Term "With Project" traffic volumes were derived by adding the project trips to the Near Term Without Project traffic volumes.

Peak Hour Intersection Level of Service

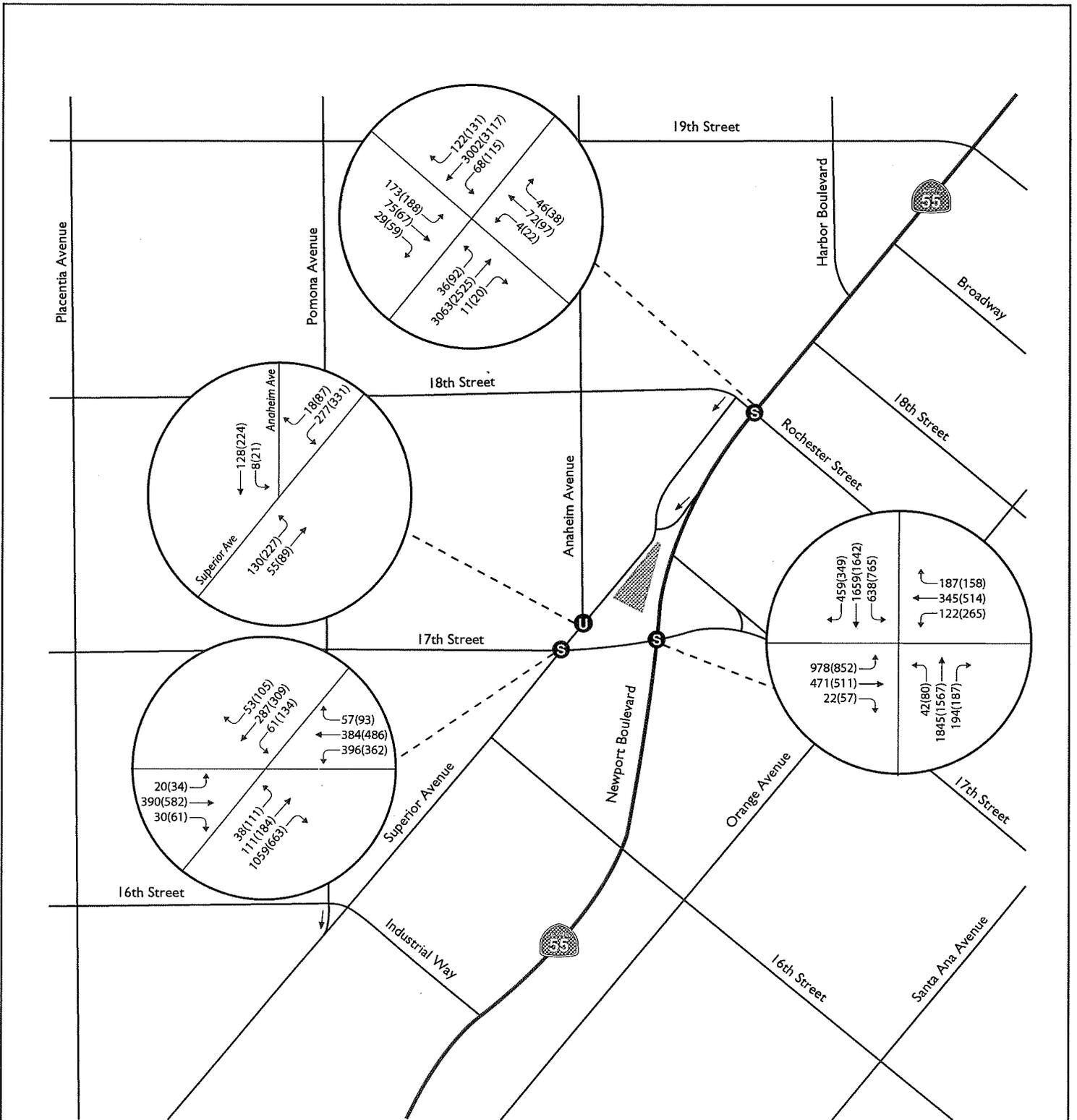
Figure 9 illustrates the AM and PM peak hour traffic volumes used for this analysis. Table 6 shows the results of the Near Term "With Project" traffic analysis. In the Near Term With Project scenario, all intersections in the AM and PM peak hours are forecast to operate at acceptable levels of service.

Table 6 – Near Term With Project Peak Hour Intersection Conditions

Signalized Intersections (ICU)	AM Peak Hour	PM Peak Hour
	ICU/LOS	ICU/LOS
Superior Avenue at 17 th Street	0.782 / C	0.776 / C
Newport Boulevard at 18 th Street	0.776 / C	0.850 / D
Newport Boulevard at 17 th Street	0.838 / D	0.798 / C
Signalized Intersections (HCM)	AM Peak Hour	PM Peak Hour
	Delay / LOS	Delay / LOS
Superior Avenue at Anaheim Avenue	13.5 / B	28.0 / D

Note: ICU = Intersection Capacity Utilization; LOS = Level of Service; Worst Case Delay is in seconds per vehicle

The level of service worksheets for Near Term With Project scenarios are provided in Appendix F.



LEGEND

- Project Site
- One-Way Street
- Signalized Intersection
- Un-Signalized Intersection
- XX(XX) AM(PM) Peak Hour Traffic Volume



Not to Scale

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8. Determination of Significant Impact

To analyze future conditions it is necessary to analyze the traffic impacts related to development of the project. The traffic impacts for the proposed project are determined by comparing the traffic conditions in the near term without the project to near term conditions with the proposed project, with special consideration at locations where level of service is not forecast to be adequate.

It is also necessary to indicate whether any predicted traffic impacts are significant. Traffic impacts are identified as significant if the proposed project results in a significant change in traffic conditions on a roadway or intersection. The significant impact criteria provided below are based on the City of Costa Mesa's traffic study guidelines. The threshold to determine significant traffic impacts for signalized intersections is as follows:

- A significant project impact occurs when the ICU value increases by greater than .01 and achieves an unacceptable level of service ("LOS E" or "LOS F").

An unsignalized intersection impact is considered to be significant if the intersection is at LOS E or F, a traffic signal is warranted, and the project contributes added trips at that location. Future added traffic is defined as the increment of traffic added by the project plus other cumulative projects identified in and around the City plus ambient traffic increment of growth that is anticipated to occur by Year 2012.

Tables 7 and 8 show the comparison of With and Without Project conditions in order to determine the project impact. As indicated, the proposed project will not generate significant impacts to the study intersections.

Table 7 – Determination of Traffic Impacts, AM Peak Hour

Intersections (ICU)	Existing AM Peak Hour				Near Term AM Peak Hour			
	Without Project	With Project	Increase	Impact	Without Project	With Project	Increase	Impact
	ICU/LOS	ICU/LOS	ICU		ICU/LOS	ICU/LOS	ICU	
Superior Ave at 17 th Street	0.760 / C	0.767 / C	0.007	No	0.775 / C	0.782 / C	0.007	No
Newport Blvd at 18 th Street	0.759 / C	0.761 / C	0.002	No	0.775 / C	0.776 / C	0.001	No
Newport Blvd at 17 th Street	0.821 / D	0.822 / D	0.001	No	0.837 / D	0.838 / D	0.001	No
Intersection (HCM)	Delay/LOS	Delay/LOS	Increase	Impact	Delay/LOS	Delay/LOS	Increase	Impact
Superior Ave at Anaheim Ave	12.7 / B	13.3 / B	0.6	No	12.9 / B	13.5 / B	0.6	No

Note: ICU = Intersection Capacity Utilization. LOS = Level of Service. Delay (Worst Case) is in seconds per vehicle.

Table 8 – Determination of Traffic Impacts, PM Peak Hour

Intersections (ICU)	Existing PM Peak Hour				Near Term PM Peak Hour			
	Without Project	With Project	Increase	Impact	Without Project	With Project	Increase	Impact
	ICU/LOS	ICU/LOS	ICU		ICU/LOS	ICU/LOS	ICU	
Superior Ave at 17 th Street	0.739 / C	0.761 / C	0.022	No	0.754 / C	0.776 / C	0.022	No
Newport Blvd at 18 th Street	0.830 / D	0.833 / D	0.003	No	0.847 / D	0.850 / D	0.003	No
Newport Blvd at 17 th Street	0.778 / C	0.782 / C	0.004	No	0.793 / C	0.798 / C	0.005	No
Intersection (HCM)	Delay/LOS	Delay/LOS	Increase	Impact	Delay/LOS	Delay/LOS	Increase	Impact
Superior Ave at Anaheim Ave	19.6 / C	26.4 / D	6.8	No	20.5 / C	28.0 / D	7.5	No

Note: ICU = Intersection Capacity Utilization. LOS = Level of Service. Delay (Worst Case) is in seconds per vehicle.

9. Conclusions

The proposed project consists of a constructing a new Walgreens Store with a total 14,310 square-foot building area, including a 9,990-square-foot retail area on the first floor and a 4,320-square-foot basement. The proposed project would be located at 1726 Superior Avenue, at the northwest corner of Newport Boulevard (SR-55) and 17th Street in the City of Costa Mesa. There are currently two existing access points along Superior Avenue for the project site. The proposed project will use one of these existing access points and relocate the second access point to the west side of the project site along Superior Avenue. The two access points will provide full access (right-in, right-out, left-in, and left-out) to the project site.

This study analyzed three signalized intersections and one unsignalized intersection in the project vicinity during the Existing and Near Term scenarios. In all scenarios analyzed, the study found that the proposed project would have no significant impact at any intersection according to the significant impact criteria set forth by the City of Costa Mesa.

KOA Corporation recommends that the City of Costa Mesa find that this project would have no adverse traffic impacts on the surrounding street system.